LISTING OF CLAIMS:

The following listing of claims replaces all previous versions and listings of claims in the present application.

1. (Original) A motor driving circuit comprising:

a semiconductor switching element interposed in a current flowing passage to a motor;

a PWM control unit for generating a PWM signal having a predetermined PWM frequency;

a driving circuit for making the semiconductor switching element carry out a switching operation under plural driving states, and driving the semiconductor switching element in PWM (Pulse Width Modulation) mode according to the PWM signal under an instructed driving state;

an overheat state detecting unit for outputting an overheat state detecting signal on a condition that a temperature of the semiconductor switching element exceeds a predetermined threshold value and the semiconductor switching element falls into an overheat state or a state in which the probability that the semiconductor switching element will shift to the overheat state is higher than a predetermined probability; and

a driving control unit for instructing the driving state of the semiconductor switching element to the driving circuit so that the rise time and fall time of the semiconductor switching element during an output period of the overheat state detecting signal are shorter than the rise time and fall time of the semiconductor switching element during a non-output period of the overheat state detecting signal.

2. (Original) The motor driving circuit according to claim 1, wherein the driving control unit controls the PWM control unit so that the PWM frequency during the output period of the overheat state detecting signal is lower than the PWM frequency during the non-output period of the overheat state detecting signal.

3. (Original) The motor driving circuit according to claim 1, wherein the driving circuit varies a resistance value of a resistor connected to the semiconductor switching element on the basis of an instruction from the driving control unit to thereby vary the rise time and the fall time of the semiconductor switching element.

4. (Original) The motor driving circuit according to claim 1, wherein the overheat state detecting unit includes a temperature detecting unit for detecting a temperature of the semiconductor switching element, and outputting the overheat state detecting signal during a period when the detected temperature exceeds the threshold value.

5. (Original) The motor driving circuit according to claim 1, wherein the overheat state detecting unit includes a current detecting unit for detecting current flowing in the semiconductor switching element, and outputting the overheat state detecting signal during a period when the detected current exceeds a predetermined threshold value.

6. (Original) The motor driving circuit according to claim 1, wherein the overheat state detecting unit includes a power supply voltage detecting unit for outputting the overheat state

detecting signal during a period when a detected power supply voltage exceeds a predetermined threshold value.

7. (Original) The motor driving circuit according to claim 1, wherein the overheat state detecting unit outputs the overheat state detecting signal during a period when a duty ratio of PWM driving exceeds a predetermined threshold value.

8. (Original) The motor driving circuit according to claim 1, wherein the overheat state detecting unit outputs an overheat state detecting signal that has two threshold values for an output judgment of the overheat state detecting signal and is brought with a hysteresis characteristic.

9. (Original) The motor driving circuit according to claim 1, wherein the PWM control unit is equipped with a motor voltage detecting unit for detecting a voltage applied to the motor, and determines the duty ratio of the PWM signal on the basis of an instructed motor voltage and a detected motor voltage.

10. (Original) The motor driving circuit according to claim 1, wherein the motor is an air blowing fan motor for a heat exchanger in a cooling system for a vehicle.

11. (Original) The motor driving circuit according to claim 2, wherein the PWM frequency during the output period of the overheat state detecting signal is set to an audible frequency band to thereby provide human perception.

12. (Original) The motor driving circuit according to claim 2, wherein the driving circuit varies a resistance value of a resistor connected to the semiconductor switching element on the basis of an instruction from the driving control unit to thereby vary the rise time and the fall time of the semiconductor switching element.

13. (Original) The motor driving circuit according to claim 12, wherein the overheat state detecting unit includes a temperature detecting unit for detecting a temperature of the semiconductor switching element, and outputting the overheat state detecting signal during a period when the detected temperature exceeds the threshold value.

14. (Original) The motor driving circuit according to claim 12, wherein the overheat state detecting unit includes a current detecting unit for detecting current flowing in the semiconductor switching element, and outputting the overheat state detecting signal during a period when the detected current exceeds a predetermined threshold value.

15. (Original) The motor driving circuit according to claim 12, wherein the overheat state detecting unit includes a power supply voltage detecting unit for outputting the overheat state

detecting signal during a period when a detected power supply voltage exceeds a predetermined threshold value.

16. (Original) The motor driving circuit according to claim 12, wherein the overheat state detecting unit outputs the overheat state detecting signal during a period when a duty ratio of PWM driving exceeds a predetermined threshold value.

17. (Original) The motor driving circuit according to claim 12, wherein the PWM control unit is equipped with a motor voltage detecting unit for detecting a voltage applied to the motor, and determines the duty ratio of the PWM signal on the basis of an instructed motor voltage and a detected motor voltage.

18. (Previously presented) The motor driving circuit according to claim 2, wherein the driving circuit, under instruction from the driving control unit, lowers a resistance value of a gate resistance connected to the semiconductor switching element such that the lower resistance value of the gate resistance lowers a charge time associated with a gate capacitance of the semiconductor switching element to lower the rise time and the fall time of the semiconductor switching element during the output period of the overheat state detecting signal.